

BIOTIC COMMUNITIES

Fish Community Data

Fish collections by MDC research and management personnel (West Central Region) are summarized. Collections are divided into three groups (large, nektonic and benthic fish) based on their ecological affinity (Pflieger 1989). Relative abundance of fish in each group is provided for each of five subbasins including Heath's Creek, Muddy Creek, Flat Creek, Richland Creek and the mainstem Lamine River. Most collections were made by seining except in areas where water was too deep. All nektonic and benthic fish were collected by seining unless otherwise indicated on summary sheets. Large fish were collected by electrofishing, seining, or a combination of the two methods. Data on the summary sheets (Appendix 4) is not highly quantitative in nature; it is meant to provide a basic idea of the community structure in each of the subbasins.

A total of 69 fish species have been collected in the Lamine River Basin by MDC personnel ([Table 6](#)). Of that total, 33 species were categorized in the "large" group which includes centrarchids, catostomids, ictalurids and other large forms. The green sunfish (*Lepomis cyanellus*) was the most abundant fish in this group and was present at all five Lamine River subbasins. Another wide-ranging species, the largemouth bass (*Micropterus salmoides*) was the second most abundant species. Surprisingly, the longear sunfish (*Lepomis megalotis*) an Ozark-lowland species (Pflieger 1971) was the third most abundant fish in the subbasin, largely due to high densities in Richland and Flat creeks which are more Ozarkian systems than Heath's and Muddy creeks. The black bullhead (*Ictalurus melas*), golden redhorse (*Moxostoma erythrurum*), bluegill (*Lepomis macrochirus*), and common carp (*Cyprinus carpio*) follow as the most common species in the drainage. All of the above species were present in all five of the subbasins (Lamine River, Heath's Creek, Muddy Creek, Richland Creek and Flat Creek). With the exception of the longear sunfish and golden redhorse, all are wide ranging species (Pflieger 1971).

A transition from Prairie to Ozark border streams is somewhat evident in the large fish group. Green sunfish were more predominant in Muddy and Heath's creeks than in Richland and Flat creeks where longear sunfish and redhorse species (black or golden) were more or equally predominant. In the mainstem Lamine River, the gizzard shad (*Dorosoma cepedianum*) was the most abundant large fish followed by a large river species, the freshwater drum (*Aplodinotus grunniens*). These species are probably more abundant in the mainstem Lamine due to its size and direct link to the Missouri River.

Largemouth bass are common in all subbasins and very abundant in Muddy Creek. Spotted bass (*Micropterus punctulatus*) were not abundant in any of the streams except the Lamine River where they represented 8% of the large fish collection. Crappie (*Pomoxis* spp.) were not abundant in any of the collections although local fishermen have commented on good crappie fishing in some of the streams including the mainstem Lamine River. Bluegill, longear sunfish, and orangespotted sunfishes (*Lepomis humilis*) were widely distributed in the basin and relatively abundant. The channel catfish (*Ictalurus punctatus*) was not predominant in any of the research collections although they represented 36 % of the catch in more recent samples of Muddy Creek. The flathead catfish (*Pylodictis olivaris*) was also rarely captured. Walleye (*Stizostedion vitreum*) were captured in very small numbers in the mainstem Lamine River and Flat Creek. A few white bass (*Morone chrysops*) were also collected from Flat Creek.

The greatest number of large fish species (28) existed in Flat Creek which probably provides a larger diversity of habitats than any other stream in the basin, due to its size and Ozark border location in the

LARGE FISH

Shortnose Gar	<u>Lepisosteus platostomus</u>
Longnose Gar	<u>L. osseus</u>
American Eel	<u>Anguilla rostrata</u>
Gizzard Shad	<u>Dorosoma cepedianum</u>
Goldeneye	<u>Hiodon alosoides</u>
Common Carp	<u>Cyprinus carpio</u>
River Carpsucker	<u>Carpionodes carpio</u>
Highfin Carpsucker	<u>C. velifer</u> *1940
Quillback	<u>C. cyprinus</u>
White Sucker	<u>Catostomus commersoni</u>
Northern Hog Sucker	<u>Hypentelium nigricans</u>
Smallmouth Buffalo	<u>Ictiobus bubalus</u>
Bigmouth Buffalo	<u>I. cyprinellus</u>
Black Buffalo	<u>I. niger</u>
Black Redhorse	<u>Moxostoma duquesnei</u>
Golden Redhorse	<u>M. erythrurum</u>
Shorthead Redhorse	<u>M. Macrolepidotum</u>
Black Bullhead	<u>Ictalurus melas</u>
Yellow Bullhead	<u>I. natalis</u>
Channel Catfish	<u>I. punctatus</u>
Flathead Catfish	<u>Pylodictis olivaris</u>
White Bass	<u>Morone chrysops</u>
Green Sunfish	<u>Lepomis cyanellus</u>
Orangespotted Sunfish	<u>L. Humilis</u>
Bluegill	<u>L. Macrochirus</u>
Longear Sunfish	<u>L. megalotis</u>
Smallmouth Bass	<u>Micropterus dolomieu</u>
Spotted Bass	<u>M. punctulatus</u>
Largemouth Bass	<u>M. Salmoides</u>
White Crappie	<u>Pomoxis annularis</u>
Black Crappie	<u>P. Nigromaculatus</u>
Walleye	<u>Stizostedion vitreum</u>

Freshwater Drum**Aplodinotus grunniens****NEKTONIC FISH****Central Stoneroller****Campostoma anomalum****Western Silvery Minnow****Hybognathus argyritis *1940****Plains Minnow****H. Placitus *1930****Horneyhead Chub****Nocomis biguttatus****Golden Shiner****Notemigonus crysoleucas****Emerald Shiner****Notropis atherinoides****Ghost Shiner****N. buchanani****Common Shiner****N. cornutus****Bigmouth Shiner****N. dorsalis****Blacknose Shiner****N. heterolepis****Red Shiner****N. lutrensis****Rosyface Shiner****N. rubellus****Sand Shiner****N. stramineus****Topeka Shiner****N. topeka****Redfin Shiner****N. umbratilis****Bluntnose Minnow****Pimephales notatus****Flathead Minnow****P. promelas****Southern Redbelly Dace****Phoxinus erythrogaster****Creek Chub****Semotilus atromaculatus****Trout Perch****Percopsis omiscomaycus****Northern Studfish****Fundulus catenatus****Plains Topminnow****F. Sciadicus****Mosquitofish****Gambusia affinis****Brook Silverside****Labidesthes sicculus*****BENTHIC FISH*****Gravel Chub****Hybopsis x-punctata****Suckermouth Minnow****Phenacobius mirabilis****Stonecat****Noturus flavus****Tadpole Madtom****N. gyrinus****Freckled Madtom****N. nocturnus *1940**

Fantail Darter

Least Darter

Johnny Darter

Orangethroat Darter

Logperch

Blackside Darter

Slenderhead Darter

Etheostoma flabellare

E. Microperca

E. Nigrum

E. Spectabile

Percina caprodes

P. maculata

P. phoxocephala

basin. The mainstem Lamine River possessed the second largest number of species (25). Muddy Creek and Heath's Creek, both Prairie streams contained the smallest number of large species.

Additional sampling in 1989 in the Heath's Creek, Muddy Creek, and Flat Creek subbasins did not reveal major changes in species composition but a few additional species were collected. Spotted bass were a new addition to the Muddy and Heath's creeks species list in 1989. The addition of spotted bass to these collections may reflect expansion from the mainstem Lamine River and Flat Creek where it was previously collected. In Muddy Creek, channel and flathead catfish as well as freshwater drum were added to the species list. In Flat Creek, the black crappie (Pomoxis nigromaculatus) was collected for the first time in 1989.

A few large fish species were collected in research samples prior to 1960 that have not been collected since. For instance, the highfin carpsucker (Carpionodes velifer), an Ozark species was collected in Flat Creek in 1940. No other specimens have been collected in the Lamine River Basin since that time.

Several nektonic species shared predominance in the Lamine River basin. Two prairie species, the common shiner (Notropis cornutus) and red shiner (Notropis lutrensis); one Ozark-Prairie species, the central stoneroller (Campostoma anomalum); and two wide ranging species, the bluntnose minnow (Pimephales notatus) and redbfin shiner (Notropis umbratilis) were equally abundant in the basin. The nektonic fish assemblage differed from prairie to Ozark border streams within the basin. Wide ranging and Prairie species such as the redbfin shiner, bluntnose minnow, and red shiner were predominant in Heath's Creek and Muddy Creek while species including the central stoneroller and southern redbelly dace predominated in Richland Creek samples. The common shiner, a Prairie species, was also abundant in Richland Creek.

Flat Creek which is a transitional stream between the Prairie and Ozark region possessed a diverse assemblage of nektonic fish including a high abundance of rosyface shiners (Notropis rubellus), red shiners, redbfin shiners, bluntnose minnows, and brook silversides (Labidethes sicculus). The northern studfish (Fundulus catenatus) and plains topminnow (Fundulus sciadicus), both Ozark species, were present in Flat and Richland Creek collections but absent in collections from the Prairie streams (Heath's Creek and Muddy Creek). The predominant nektonic species in the mainstem Lamine River was the ghost shiner (Notropis buchanani), a Prairie species, which was present at two of the three collection sites. The red shiner and bluntnose minnow were also abundant in the mainstem Lamine River.

One species of special interest is the topeka shiner (Notropis topeka). One specimen was found in Clear Creek in 1992, and three specimens were found in Greer Spring in 1995. Populations of this species seems to be declining possibly due to siltation in the agricultural watersheds where it remains (Pfleiger 1997).

Additional fish collections in 1989 did not reveal major shifts in nektonic fish assemblages. A collection from Haw Creek in the Flat Creek Subbasin yielded a large number of central stonerollers which were not abundant in research samples. This may have been due to the location of the sampling site on Haw Creek which is a more Ozarkian stream than other tributaries in the Flat Creek Subbasin.

A few members of the nektonic group were present in earlier research samples and never collected in later years. The plains minnow (Hybognathus placitus), a big river species, was collected in the mainstem Lamine River in 1940. The western silvery minnow (Hybognathus argyritis), also a big river species was collected in Muddy Creek in 1940.

The orangethroat darter (*Etheostoma spectabile*) was by far the most abundant benthic species in the Lamine River Basin. The species represented 45-75 % of the collection in all five of the subbasins. Other benthic fish common to most subbasins were the suckermouth minnow (*Phenacobius mirabilis*) and fantail darter (*Etheostoma flabellare*). In the mainstem Lamine River the slenderhead darter (*Percina phoxocephala*), an Ozark-Prairie species, was the second most common benthic fish. The suckermouth minnow and gravel chub (*Hybopsis x-punctata*) were also common in the mainstem Lamine River. In the Prairie streams, Heath's Creek and Muddy Creek, the orangethroat darter represented about 50 % of the catch and the other 50 % mainly consisted of johnny darters (*Etheostoma nigrum*); logperch (*Percina caprodes*); and suckermouth minnows. Flat Creek possessed the greatest number of species of benthic fishes (11) including the least darter (*E. microperca*), an Ozark species, and the blackside darter (*E. maculata*), a Prairie species. Richland Creek collections contained only five benthic fish species and 80 % of the specimens were orangethroat darters.

A unique species collected in the past was the freckled madtom (*Noturus nocturnus*) of which one specimen was collected in the mainstem Lamine River in 1940. The freckled madtom is a lowland species which is not abundant at any locations in Missouri (Pflieger 1975). Additional collections did not reveal major changes in the fish community or benthic species as compared to earlier research collections.

Overall, a shift in the fish assemblage from Prairie to Ozark-border streams is evident in the Lamine River Basin. Flat Creek represents the transition between the two regions and contains a very diverse fish community. Major changes in the fish community of the Lamine River basin over the last 20 years are difficult to detect due to the lack of recent collections. Several key species exist in the basin that may serve as indicators of increased water quality as new stream and watershed projects progress. Examples are the topeka shiner, rosyface shiner, least darter, northern studfish and plains topminnow. The blacknose shiner is also of special interest due to its endangered status in the state. The Lamine River provides fishing opportunities for [largemouth and spotted bass](#), white bass, catfish, sunfishes and crappie. Specialized sampling techniques should provide a better representation of the sport fish community. Another sport fish, walleye, may have been more abundant in the mainstem Lamine River during the early part of this century. This supposition is based on accounts related by older anglers in the area. As fish sampling continues, walleye spawning habitat may be better identified enabling fisheries managers to increase the abundance of this species to the basin.

Ichthyoplankton Collection

Larval fish taxa collected in the Lamine River by Brown (1989) are shown in ([Table 7](#)). The list includes two additions, the paddlefish (*Polyodon spathula*) and blue sucker (*Cycleptus enlongatus*), to those previously reported by MDC.

Aquatic Invertebrates

Twenty-seven species of mussels have been collected in the Lamine River Basin since 1965 (Oesch 1984; [Table 8](#)). Based on the general range of crayfish in Missouri (Pflieger 1996), a list of species expected in the Lamine River basin is provided ([Table 9](#)).

Threatened and Endangered Species

The blacknose shiner (*Notropis heterolepis*), a state listed endangered species in Missouri, has been

Taxa	1987	1988
<u>Polydodon spathula</u>	X	X
<u>Lepisosteus</u> spp.	X	
<u>Dorosoma cepedianum</u>	X	X
<u>Hiodon alosoides</u>	X	X
<u>Cyprinid</u> spp.	X	X
<u>Cyprinus carpio</u>	X	X
<u>Carpionodes</u> spp.	X	X
<u>Catostomus commersoni</u>		
<u>Cycleptus elongatus</u>	X	X
<u>Ictiobus</u> spp.	X	X
<u>Ictalurus punctatus</u>	X	X
<u>Pylodictis olivaris</u>	X	
<u>Gambusia affinis</u>	X	
<u>Morone chrysops</u>	X	X
<u>Lepomis</u> spp.	X	X
<u>Pomoxis</u> spp.	X	X
<u>Percina</u> spp.	X	
<u>Aplodinotus grunniens</u>	X	X

Paper Floater	<u>Anodonta imbecilis</u>
Giant Floater	<u>A. grandis</u>
Squaw Foot	<u>Strophitus undulatus</u>
White Heel Split	<u>Lasmigona complanata</u>
Pistol-Grip	<u>Tritogonia verrucosa</u>
Maple Leaf	<u>Quadrula quadrula</u>
Pimple-Back	<u>Q. pustulosa</u>
Three-Ridge	<u>Amblema plicata</u>
Wabash Pig-Toe	<u>Fusconaia flava</u>
Round Pig-Toe	<u>Pleurobema sintoxia</u>
Lady Finger	<u>Elliptio dilatata</u>
Pound Horn	<u>Unio merus tetralasmus</u>
Three-Horned Warty-Back	<u>Obliquaria revlexa</u>
Ellipse	<u>Venustaconcha ellipsiformis</u>
Deer-Toe	<u>Truncilla truncata</u>
Fragile Paper Shell	<u>Leptodea fragilis</u>
Pink Heel-Splitter	<u>Potamilus alatus</u>
Pink Paper Shell	<u>P. ohioensis</u>
Pond Mussel	<u>Ligumia subrostrata</u>
Slough Sand Shell	<u>Lampsilis teres</u>
Fat Mucket	<u>L. radiata</u>
Pocketbook	<u>L. Ventricosa</u>

Table 9. List of Crayfish expected to occur in the Lamine River Basin based on distribution maps in Pflieger (1987).

Papershell Crayfish	<u>Orconectes</u> <u>immunis</u>
Northern Crayfish	<u>O.</u> <u>Virilis</u>
Prairie Crayfish	<u>Procambarus</u> <u>gracilis</u>
Devil Crayfish	<u>Cambarus</u> <u>diogenes</u>

collected as recently as 1962 in South Flat Creek. No threatened or endangered crayfishes or mussels are listed for consideration in the basin (Missouri Natural Heritage database 1999).

The Topeka shiner was placed on the Federal Endangered species list in January 1999. Only small, remnant and fragmented populations have been recently documented in smaller subwatersheds within Lamine River watershed.

Introductions

Bighead Carp are native to eastern China and were introduced to Arkansas in 1973. They are easily identified by the location of eyes below the midline of the fish. They have reached 40 to 50 pounds in as little as 5 years. Evidence of natural reproduction in Missouri waters occurred in 1989 when they were seined from Carroll County stream. Bighead Carp are found most commonly in the big rivers and the lower portions of their large tributaries. They obtain food by passing water over gill rakers. Zooplankton is the primary diet, but phytoplankton are also consumed. Food habits of this fish may conflict with native fish species such as paddlefish, bigmouth buffalo and young of other native species.

Grass Carp are native to Eastern Asia and released into open water of Arkansas shortly after 1963. They were first documented in Missouri in 1971 in the Mississippi River. They have become numerous in the large rivers, and the 1992 commercial harvest was nearly 40,000 pounds. They are stocked in many farm ponds to control aquatic vegetation problems. They sometimes escape to smaller streams where they are sometimes found. Young grass carp feed on small crustaceans and other invertebrates. At about 8 inches long, they shift to a diet consisting of much aquatic vegetation and some animal matter. Harmful effects on native fish populations was feared, but effects have not yet been documented.

River Otters (*Lutra canadensis*) were reintroduced to Lamine River in 1983. The population has done well. Since 1996, trappers have helped manage otter populations in Lamine River and other areas throughout the state.

Other Management/Research Efforts

An invertebrate and fish recolonization study was initiated following a major fish kill on Muddy Creek in November 1989 (see Fish Kill section). The study will determine the chronology of natural repopulation of fish and invertebrate species, provide basic water quality information and stream habitat information along the impacted reach.

Four University of Missouri (UMC) studies are currently being conducted in the Lamine River basin. A study to provide baseline information on species composition and relative abundance and biomass of macroinvertebrates in Richland and Flat creeks as well as the mainstem Lamine River is completed. Major habitats sampled were riffle, snag, water willow (*Justicia americana*) and pool. Riffle and snag habitats in all streams had the greatest biomass which were dominated by filter feeding Trichoptera. While these two habitats contributed the greatest biomass per unit area, they comprised less than four percent of the total area. Results indicate that any efforts to increase total area available in either of these habitat types (such as artificial riffles or tree revetments) will result in positive increases of invertebrate densities and biomass in these streams.

A second study is being conducted to monitor fish communities in headwater creeks of agricultural watersheds throughout Missouri including Cheese, Flat, Henry and Spring Fork creeks in the Lamine River Basin. The study is designed to compare fish communities in watersheds that have received special

land treatment (SALT) to those that have not. In addition to fish sampling, data related to stream health such as invertebrate abundance and diversity, frequency of flow, substrate composition, oxygen concentrations, temperature, nutrient and suspended solid concentrations and habitat variables also are being collected. Objectives are to determine whether these variables respond to the farmland management program and to relate differences in stream characteristics to differences in fish community structure among the streams.

A third study recently initiated by UMC personnel involves fish and habitat sampling on Haw and Gabriel creeks. Objectives of the study are as follows: 1) to develop useful models, and test and refine existing models, relating habitat characteristics to fish community structure and to density and biomass of smallmouth bass and other centrarchids; 2) to determine microhabitat preferences of several stream fish which would be used in developing habitat suitability curves for habitat evaluations or instream flow evaluations specific to Ozark border streams; and 3) to evaluate the applicability of currently used biological indices of fish communities as measures of stream integrity to Ozark border streams.

For further information or copies of annual reports on the three UMC studies listed above, contact Dr. Charlie Rabeni, 112 Stephens Hall, UMC, Columbia, Missouri 65211.

One other project involves the lower two miles of the Lamine River near its confluence with the Missouri River. The project objective is to determine relative and seasonal abundance, growth rates and condition of juvenile catfish in various habitats of the Missouri River including the lower portions of tributaries. Sampling was conducted on the Lamine River from July 1988 to November 1989 with small mesh hoop nets.